

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Apparatus for Lifting Loads

5 We, MANN EGERTON & COMPANY LIMITED, a British Company, of 5, Prince of Wales Road, Norwich, Norfolk, England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to apparatus for lifting loads primarily, but not exclusively, for use in lifting small motor vehicles to an elevated position to give access to the underneath of the vehicle to facilitate maintenance and service.

15 According to the invention there is provided apparatus for lifting loads, primarily for lifting motor vehicles, comprising a base, a supporting frame or platform mounted on said base by means of parallelogram linkage mechanism, a fluid pressure operated ram operable to raise the supporting frame or platform in a direct vertical path, and a lever coupled to the plunger of the ram and so mounted and arranged that, when actuated by said ram, it imparts an initial upwardly directed propulsion force on said parallelogram linkage mechanism, to initiate elevation of the supporting frame or platform, and subsequently to impart an upwardly directed traction force on said parallelogram linkage mechanism, to complete the elevation of said supporting frame or platform.

25 In order that the invention may be clearly understood one embodiment thereof will now be described, by way of example, with reference to the drawings accompanying the Provisional Specification, in which:—

30 Figure 1 is a plan view of lifting apparatus according to the invention,

40 Figure 2 is a side elevation showing the apparatus in its elevated position, and

Figure 3 is a side elevation showing the apparatus in its collapsed or lowered position.

Referring to the drawings the lifting apparatus comprises a base 2 having two spaced parallel guide-ways 3 and 4 of channel section, interconnected by transverse members 5, and a vertical vehicle supporting frame or platform 6 mounted on said base 2 by means of parallelogram linkage mechanism 7 by means of which said supporting frame or platform 6 can be raised vertically from the lowered or collapsed position, shown in Figure 3, to the elevated position, shown in Figure 2, by means of a fluid pressure operated ram 8, 18. Each corner of the supporting frame or platform 6 is supported by a leg 9 of the parallelogram linkage mechanism, each said leg being pivoted at its upper end to said supporting frame or platform and bearing at its lower end on the guideway 3 or 4 through a roller 10. The supporting legs 9 of each of each pair of legs located at the front and rear of the apparatus are interconnected intermediate their ends by transverse shafts 11 and 12 and said shafts are interconnected by horizontal parallel members 13, 14 forming parts of the parallelogram linkage mechanism. The shafts 11 and 12 are further connected at fixed points 15 to the base 2 by means of parallel levers 22, 22a respectively each of said levers being pivotable about the axis of its respective shaft and about the fixed point 15. The pivotal movement of each of the levers 22a relative to the axis of the shaft 12 is however limited, for the purpose hereinafter described, by stops 24, Figure 1, on the levers 22a which engage shoulders 25 formed integral with the shaft 12. In order to add rigidity to the parallelogram linkage mechanism a transverse strengthening plate 21, or alternatively suitable cross-bracing, may be provided between the legs 9 of one or both pairs of said legs. The supporting frame or platform 6 is

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provided with adjustable transverse supporting beams 16 slidable along said supporting frame or platform and adjustably slidable along said beams is a pair of pads 17 upon which the vehicle, or other load is directly supported. Thus, the supporting beams 16 and pads 17 are fully adjustable to suit the jacking points of the vehicle or other load.

The fluid pressure operated ram comprises an hydraulic cylinder 8, which is pivoted at a fixed point 23 to the base 2, and an operating plunger 18 pivotally connected at its outer end to one end of a second order lever 19 mounted intermediate its ends for rotation about the axis of transverse shaft 12. On the opposite free end of the lever 19 is mounted a roller 20 which, in the lowered position of the lift, rests on a rail 26 fixed to or forming part of the base 2.

In operation the load to be lifted, for example a small motor vehicle, is run over the apparatus when the latter is in the lowered or collapsed position shown in Figure 3, and the slidable transverse beams 16 and the pads slidable thereon are moved into appropriate jacking positions to engage the parts of the vehicle body or chassis by which the vehicle is to be supported. The ram 8, 18 is then operated whereupon the plunger 18 is projected causing the lever 19 to be rotated about the axis 12 and thus impart a downwardly directed force to the end of the lever carrying the roller 20. This roller end of the lever is thus forced down into contact with the rail 26 and runs along said rail thereby imparting an upwardly directed propulsion or pushing force to the shaft 12, and thus also to the parallelogram linkage mechanism and the supporting frame or platform carried thereby to effect initial raising of the supporting frame or platform. After this initial raising of the supporting frame or platform the continued projection of the plunger 18 causes the lever 19 to be rotated about the axis of shaft 12 into the position shown in Figure 2 when its rotation is arrested by the stops 24 on levers 22a engaging the shoulders 25 on the shaft 12 (see Figure 1). The lever 19 then exerts a traction or pulling force on the shaft 12 to raise the supporting frame or platform 6 to its fully elevated position (Figure 2) through the parallelogram linkage mechanism.

The particular arrangement of the lever 19 gives a two-to-one leverage to the parallelogram linkage mechanism when the various linkages of said mechanism have the least mechanical advantage, thus considerably facilitating the initial raising of the supporting frame or platform. Furthermore by the particular construction and arrangement of the parallelogram linkage mechanism, according to which the lower ends of the legs 9 travel along the guide-ways 3, 4 during the raising of the apparatus, the supporting frame

or platform 6 is elevated in a direct vertical path.

The power means (not shown) for operating the ram 8, 18 may be mounted on the base 2 at one end. This may comprise an electric motor and hydraulic pump or an air/oil booster using 150 p.s.i. air pressure, or a foot pump.

In a modification of the apparatus spring loaded detachable wheels and a slewing handle may be provided to allow the device to be moved into position beneath a motor vehicle or other load. In use, with a load on the platform, the base of the device would then be forced into contact with the ground against the pressure of the spring loaded wheels. In this modification the device may be inserted under the vehicle from one side.

It will be understood that the invention is not limited to the particular construction herein described and illustrated but may be modified in various other ways without departing from the scope of the invention as defined in the appended claims. For example, the embodiment described is provided with the supporting frame or platform 16, 17 for lifting and supporting a vehicle by parts of the body or chassis between the front and rear wheels so that the wheels and the suspension units remain unsupported. In a modified arrangement however, supporting tracks may be provided on each side of the apparatus so that, when in its lowered position, a vehicle can be driven onto these tracks and lifted and supported by its wheels. The term supporting frame or platform used herein is therefore to be understood as including such supporting tracks. The particular construction of lifting means according to the invention is particularly suitable for this purpose because in its lowered position the parts are of very small height (see Figure 3) and indeed are at a height which is less than the height between the ground and the chassis of any mounted vehicle.

The device may also be provided with suitable stops at one end of the supporting frame, platform or tracks so that when the vehicle is moved thereon it is stopped in the correct position on said supporting frame, platform or tracks.

The apparatus may also be provided with suitable safety device, for preventing it from collapsing should a failure occur in the hydraulic, electric or other power system, for example a spring loaded cable operated plunger may be provided for locking the apparatus in its elevated position.

WHAT WE CLAIM IS:—

1. Apparatus for lifting loads, primarily for lifting motor vehicles, comprising a base, a supporting frame or platform mounted on said base by means of parallelogram linkage mechanism, a fluid pressure operated ram

- operable to raise the supporting frame or platform in a direct vertical path, and a lever coupled to the plunger of the ram and so mounted and arranged that, when actuated by said ram, it imparts an initial upwardly directed propulsion force on said parallelogram linkage mechanism, to initiate elevation of the supporting frame or platform, and subsequently to impart an upwardly directed traction force on said parallelogram linkage mechanism, to complete the elevation of said supporting frame or platform.
2. Apparatus according to Claim 1, wherein said lever is pivotally mounted intermediate its ends to a part of said parallelogram linkage mechanism, with one of its ends connected with the plunger of the ram and the other end bearing on said base, or a rail forming part of said base when in the lowered position of the lift.
3. Apparatus according to Claim 2, wherein said lever is integral with a transverse shaft rotatably mounted in parts of said parallelogram linkage mechanism, stop means being provided for limiting the rotatable movement of said shaft and lever.
4. Apparatus according to claim 2 or 3, wherein the end of the lever bearing on said base or said rail is provided with a roller engaging said base or rail.
5. Apparatus according to any one of claims 1 to 4, wherein said lever is a second order lever.
6. Apparatus according to any one of the preceding claims, wherein said parallelogram linkage mechanism comprises a front and rear pair of legs pivotally connected at their upper ends to the supporting frame or platform, and pivotally connected intermediate their ends by transverse shafts to the upper ends of levers which are pivoted at their lower ends to fixed points of the base, the lower ends of said legs being movable in guide-ways on said base.
7. Apparatus according to claim 6, wherein the lower end of each of said legs is provided with a roller running in a channel section member forming a guide-way.
8. Apparatus according to any one of the preceding claims, wherein the supporting frame platform comprises a pair of transverse beams adjustably movable along said frame or platform and supporting pads slidable along said beams as and for the purpose set forth.
9. Apparatus according to any one of the preceding claims, wherein the apparatus is provided with detachable spring loaded wheels for permitting the apparatus, when in lowered position, to be moved into position below a vehicle.
10. Apparatus for lifting loads such as motor vehicles, comprising a base, a supporting platform mounted on said base by parallelogram linkage mechanism, a fluid pressure operated ram for elevating said supporting platform from a lowered to an elevated position through said parallelogram linkage mechanism, the ram being coupled with said parallelogram linkage mechanism by means of a second order lever arranged to impart an initial upwardly directed propulsion force on said parallelogram linkage mechanism and subsequently to impart an upwardly directed traction force on said mechanism, and said parallelogram linkage mechanism being so constructed and arranged as to raise said supporting frame or platform in a direct vertical path.
11. Apparatus for lifting loads, primarily for lifting motor vehicles, constructed and adapted to operate substantially as herein described with reference to the drawings accompanying the Provisional Specification.

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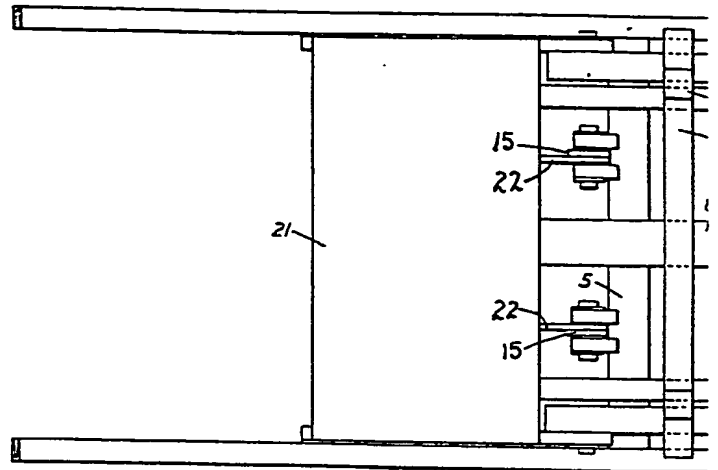


FIG. 1.

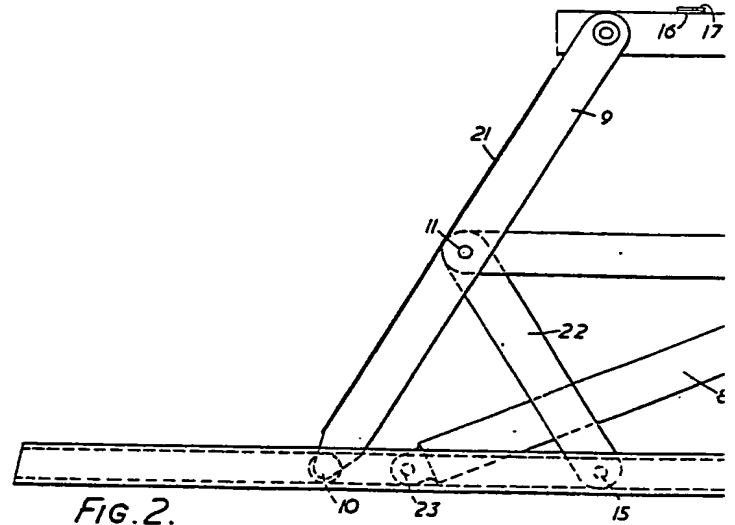


FIG. 2.

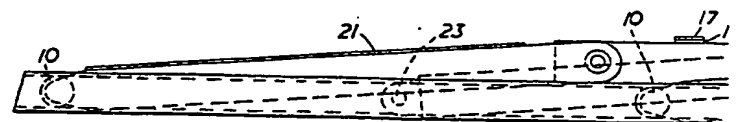


FIG. 3.

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1 SHEET

PROVISIONAL SPECIFICATION
*This drawing is a reproduction of
the Original on a reduced scale*

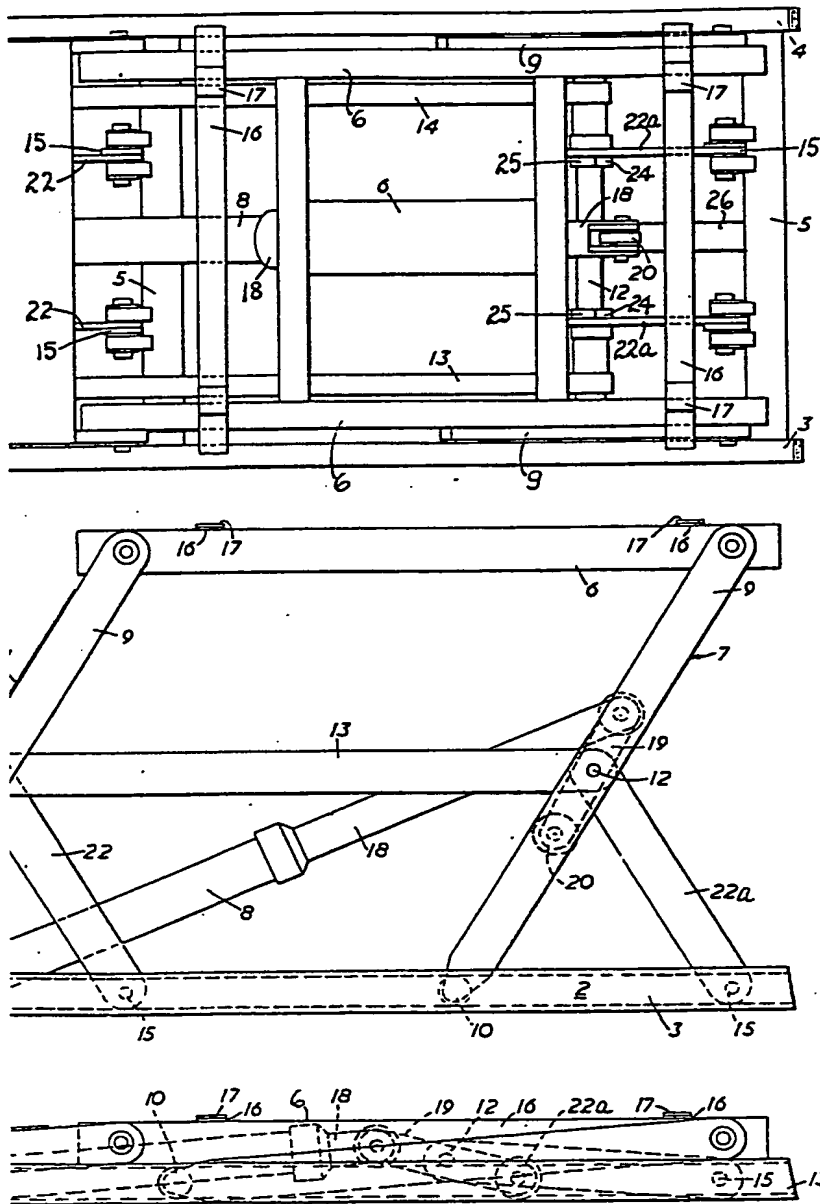


FIG. 3.

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